
Citation:

Lowcock, D and Kime, NH and South, J (2009) An evaluation of the Impaired Glucose Tolerance (IGT) pilot project. Project Report. Bradford and Airedale Teaching PCT.

Link to Leeds Beckett Repository record:

<https://eprints.leedsbeckett.ac.uk/id/eprint/597/>

Document Version:

Monograph (Other)

The aim of the Leeds Beckett Repository is to provide open access to our research, as required by funder policies and permitted by publishers and copyright law.

The Leeds Beckett repository holds a wide range of publications, each of which has been checked for copyright and the relevant embargo period has been applied by the Research Services team.

We operate on a standard take-down policy. If you are the author or publisher of an output and you would like it removed from the repository, please [contact us](#) and we will investigate on a case-by-case basis.

Each thesis in the repository has been cleared where necessary by the author for third party copyright. If you would like a thesis to be removed from the repository or believe there is an issue with copyright, please contact us on openaccess@leedsbeckett.ac.uk and we will investigate on a case-by-case basis.



leeds metropolitan university

**An evaluation of the Impaired Glucose Tolerance (IGT)
pilot project**

Bradford and Airedale Teaching PCT

January 2007- January 2009

**Diane Lowcock,
Nicky Kime
and
Jane South**

April 2009

Acknowledgements

The authors would like to thank the following people without whom this report could not have been completed.

Clare Bancroft the IGT public health advisor, who made our lives easy, by organising the service user interviews and collecting and sharing the monitoring data.

Everyone who has taken part in the evaluation, especially those individuals who gave their time to be interviewed.

The IGT Steering Group for providing insightful comments during the meetings that took place during the lifespan of the evaluation.

The general practice staff of the Bowling Hall, Horton Park, Idle Medical Centre, Westcliffe Medical Centre, Wibsey Medical Centre and finally Windhill Green Medical Centre, who made us feel welcome in their workplaces.

In the CHPR, we would like to thank Vicky Crossley for transcribing the client interviews data.

Contents Page

Acknowledgements	ii
Contents	iii
List of Tables	iv
List of figures	v
Abbreviations	vi
Executive Summary	vii-viii
Section 1: Introduction	1-4
Section 2: Evaluation Methodology	5-11
Section 3: Findings Qualitative	12-25
Section 4: Findings Monitoring data	26-30
Section 5: Discussion of evidence	31-36
Section 6: Recommendations	37
References	38-39
Appendices	40-50
Appendix 1 Service User Interview schedule	40
Appendix 2 Interview schedule (Referring Agencies)	42
Appendix 3 Focus Group Schedule for Project Team	43
Appendix 4 IGT Initial Assessment Form	45
Appendix 5 Continuous Assessment Form	46
Appendix 6 GPPA Questionnaire	47
Appendix 8 Monitoring Data Informed Consent Form	48
Appendix 9 Consent Form for Service User Interviews	49
Appendix 10 Service User Information Sheet	50

List of Tables

Table 1 Number of client interviews

Table 2: Number of Service Users by Practice

Table 3: Characteristics of the Service Users

Table 4: Changes in impact indicators

List of Figures

Figure 1: Age of Service Users

Figure 2: Indicator of Patient Deprivation

Figure 3: Flow chart of Service Users throughout project

Figure 4 : Client Pathway through IGT pilot project.

Abbreviations

CHPR Centre for Health Promotion Research at Leeds Metropolitan University

GTT Glucose Tolerance Test

IGT Impaired Glucose Tolerance

IGT-PHA Impaired Glucose tolerance Public Health Advisor

Executive Summary

Introduction to the IGT project.

A pilot project, developed by Bradford and Airedale Teaching PCT was designed to identify patients within general practice with impaired glucose tolerance (IGT) and refer them to public health advisor who could provide support and individually tailored weight management programme over a period of one year. The aim of the IGT project was to prevent progression of IGT to the more serious condition of type 2 diabetes. Six general practices in Bradford and Airedale were involved in referring their clients into the pilot IGT project. This report details the methods and findings for an evaluation undertaken by the Centre for Health Promotion Research at Leeds Metropolitan University. A discussion of evidence and recommendations about the nature and future direction of the pilot project are made in the final sections 5 and 6 respectively.

Evaluation methods (see section 2)

The evaluation strategy was developed to provide feedback on the development and functioning of the programme and any early outcomes.

Below are the evaluation objectives.

1. To examine the acceptability, relevance and appropriateness of the scheme for participants and primary health care staff;
2. To identify factors influencing the delivery and utilisation of IGT project in general practice;
3. To assess the effectiveness of IGT project in motivating and supporting individuals with IGT to make lifestyle changes;
4. To develop monitoring systems that will measure intermediate and long term health outcomes of participants.

A pluralistic approach to the evaluation was used using qualitative approaches to unpick project processes and secondary data analysis of monitoring data for outcome change and evidence of success.

Main findings (see sections 3 and 4)

Clients could be successfully diagnosed and referred into the IGT project.

There was some diversity in the approaches used to identify clients for IGT testing by general practices ranging from systematic to more ad-hoc.

The glucose tolerance test (GTT) was initially problematic due to firstly long waiting times between referral for testing and undertaking the test and secondly was perceived to be inconvenient to the client group.

The IGT diagnosis initially raised anxiety in the client group who in the main lacked a detailed knowledge base of IGT and type 2 diabetes. Most clients were unaware that type 2 diabetes was a preventable condition.

There were relatively large amounts of clients who dropped out of the project before the 3 month monitoring period.

All the clients interviewed about their experience on the IGT project were extremely positive and felt that the information and skills they developed enabled them to manage their weight. Clients particularly valued the flexible tailored approach to their own weight management and the more participatory tone of the consultations.

For clients that successfully maintained their weight loss, positive and regular feedback from an IGT advisor appeared to be important factor.

The analysis of the monitoring data revealed that there were statistically significant reductions in waist circumference (42.89 vs 41.70 $p=0.001$), weight (92.63 vs 89.58 $p=0.004$) and mean BMI (32.84 vs 31.97 $p=0.006$) over a 3 month period after referral onto the scheme. However, these changes were of a small order of magnitude probably resulting from the small sample size of 28 clients who provided data for the 3 month monitoring period.

Issues for consideration (see section 6)

- Develop health education materials to raise awareness about the prevention of type 2 diabetes by identifying its' precursor impaired glucose tolerance.
- The feasibility of using a standard protocol approach to identification of potentially IGT patients across all practices should be assessed.
- Consider using HbA1c test as a more rapid screening test for IGT, instead of the GTT test.
- Undertake further analyses to identify why there is a relatively large attrition rate from the project.
- Continue to collect and analyse monitoring data to measure the long term effectiveness of the project.

Introduction

Type 2 diabetes mellitus is a metabolic disorder where the production of insulin is insufficient to overcome an increased resistance to the action of insulin. Insulin is a hormone which regulates the amount of glucose in the blood. Where resistance to insulin action is increased this leads to a prolonged and chronic elevated blood glucose level, posing a significant health risk. This disorder is associated with severe pathologies including coronary vascular disease and stroke, blindness and kidney failure (Schulze and Hu, 2005). The prevalence and incidence of type 2 diabetes has been increasing steadily over the last 15 years. Diabetes prevalence increased from 2.8% in 1996 to 4.3% in 2005. The incidence (newly reported cases) of type 2 diabetes increased 2.60/1000 person in 1996 to 4.31/1000 person in 2005 in the UK (González, Johansson, Wallander, and García Rodríguez, 2009).

This increase in type 2 diabetes can be explained by a parallel increase in the main risk factor, obesity (World Health Organisation, 2002). However, the distribution of body fat around the waist is thought to be important in predicting risk of type 2 diabetes rather than total fat measured by Body Mass Index (Rexrode, Carey, Hennekens, Walters, Colditz, and Stampfer, 1998). Physical inactivity is likely to be an important contributing factor in the development of type 2 diabetes and activity levels have also declined sharply in the last 30 years (Dunstan, Salmon, Owen, Armstrong, Zimmet and Welborn, 2004). Nutritional intake as a risk factor for type 2 diabetes is more difficult to assess due to the complexity of measuring food intake by valid and acceptable methods. However, there is good evidence that increasing physical activity and reducing calorific intake is likely to protect against development of type 2 diabetes (Lindstrom, Ilanne-Parikka, Peltonen, Aunola, Eriksson, and Hemio, 2006).

Impaired Glucose Tolerance (IGT) is often referred to as the precursor to type 2 diabetes. This condition is part of the pathogenic chain associated with increased resistance to insulin that will eventually result in type 2 diabetes for approximately 70% of patients that have IGT (Nathan, Davidson and Defrenzo, 2007). This progression has been shown to take place 5.8 to 6.5 years after initial impaired glucose tolerance takes place. (de Vegt, Dekker, Jager, Hienkens, Kostense, and Stehouwer, 2001)

Several studies have shown that IGT can be reduced or maintained at a non-diabetic level with the intervention of lifestyle advice and action (Garber, Handelsman and Einhorn, 2008; Olroyd, Unwin, White, Imrie, Mathers and Alberti, 2001).

Prevention of type 2 diabetes has obvious benefits to the individuals with IGT given the serious complications and risk of premature death (NHS Direct, 2006). In addition halting progression from IGT to type 2 diabetes has the potential to reduce economic costs on the NHS service for provision of diabetes services both in primary and acute care settings (Tuomilehto, *et al.*, 2001; Knowler and Diabetes Prevention Program Research Group, 2002). It is estimated that five percent of the NHS budget or close to £10million a day is spent on treating diabetes and its effects, usually dealing with its long term complications (Diabetes UK, 2004).

Bradford and Airedale Teaching PCT developed an IGT pilot project (originally named Better Health in Practice) in order to assess the feasibility of providing lifestyle interventions directed at individuals characterised as IGT. This report details the findings of the evaluation of the IGT project.

Description of the IGT project.

The purpose of the pilot project is to help patients diagnosed with Impaired Glucose Tolerance (IGT) reduce their risk of developing diabetes by using a community-based approach to support them in making changes to their diet and physical activity to reduce their BMI to 25 or below.

The usual care pathway for such patients is being seen by the Practice Nurse on a yearly basis, with information and advice being provided on diet and exercise. Most of these patients have a BMI greater than 30 and are classed as obese. Helping them reduce their weight will therefore reduce their likelihood of developing diabetes and other obesity-related diseases and conditions.

This pilot project relies on members of the Primary Health Care (PHC) team to identify individuals who have IGT within a general practice setting and refer them on to an IGT public health advisor (IGT-PHA).

The project aims to

1. Work with the individual in terms of behaviour change, devising a number of sessions to support and help the patient have the confidence to make lifestyle changes.
2. It will help patients recognise their susceptibility to diabetes and appreciate the serious nature of the disease.
3. Help understand the benefits of lifestyle change and recognise any barriers to change and the extent to which these are outweighed by the benefits.
4. Empower people to develop their self efficacy to enable them to overcome environmental, social and cognitive factors that mitigate against required behaviour change.
5. A series of sessions will be provided for each patient, delivering healthy eating and general lifestyle advice.
6. Goals will be set between the patient and advisor and follow up sessions will be made to support patients through the changes.
7. Where necessary, patients may be referred into the community, using and developing local services and networks.
8. Continued support will depend entirely on individual situations.

(Taken from IGT project plan, Hoyle, 2007.)

The pilot programme formally began in January 2007 when a public health advisor for the IGT project was appointed. A Steering Group was set up and met every two months at the start of the project thereafter quarterly. A number of general practices expressed an interest in joining the scheme and the first clients were referred to the advisor in April 2007. Further details about practices can be found in the section on findings from the monitoring data.

The Centre for Health Promotion Research (CHPR) at Leeds Metropolitan University was commissioned to evaluate the pilot IGT project.

The following evaluation objectives were agreed by the CHPR and IGT Steering Group.

5. To examine the acceptability, relevance and appropriateness of the scheme for participants and primary health care staff;
6. To identify factors influencing the delivery and utilisation of IGT project in general

- practice;
7. To assess the effectiveness of IGT project in motivating and supporting individuals with IGT to make lifestyle changes;
 8. To develop monitoring systems that will measure intermediate and long term health outcomes of participants.

This report is divided into six sections. The evaluation approach and methods are described in section 2. Section 3 reports on the qualitative findings from the service users and practitioners including the IGT project team, while section 4 presents analysis of the monitoring data. The report ends with a synthesis of the evidence and discussion of key issues emerging from the evaluation (section 5) and recommendations for practice in section 6.

2. Evaluation Methodology

The evaluation strategy evolved after discussion with the IGT steering group prior to the start of the project and development of monitoring systems.

The approach to evaluating the Impaired Glucose Tolerance Project was pluralistic and drew on both qualitative and quantitative methods to assess the value of the project from the perspectives of service users, practice staff, and the wider project team. This methodological pluralism has its strengths rooted in both, positivism, drawing on valid quantitative measurements of short and medium term impacts and interpretivism, seeking to illuminate the subjective experiences of service users and practitioners. In addition contextual factors that could explain why and how change occurred were investigated. The evaluation study used a, pre and post study design without a comparison group to assess impact indicators and exploration of client and practitioner perspectives about the IGT project.

2.1 Data collection methods

2.1.1 Qualitative approaches

Qualitative semi-structured interviews were thought to be the most appropriate method to unpick both service user and practitioner perspectives on the IGT project processes and experience. A service user interview schedule (see Appendix 1) was constructed using a narrative and timeline approach asking service users how they came onto the project and charting their journey through the process. A referring agency practitioner interview schedule (Appendix 2) was developed by using a similar approach, but focussed more on referral of appropriate patients into the IGT project and logistical & communication issues between the practice staff and IGT public health advisor.

To investigate the processes and contextual factors across the range of general practices involved in referring their patients, a focus group was undertaken with the wider project team which included members of the steering group. The focus group schedule was designed to unpack issues that had been raised previously within the steering group meetings and service user interviews. (Appendix 3)

All schedules were negotiated and agreed with the steering group prior to implementation.

The CHPR team were invited to attend all steering group meetings. The minutes of the meetings have been used to highlight important issues and contextualise the findings of the IGT project.

2.1.2 Sampling and recruitment.

Service users

Clients on the IGT project were sampled purposively using a maximum variation sampling technique (Patton, 1990). Several criteria (gender, age, referring general practice, length of time on project and achievement in weight management) were used to gain as much diversity in the sample as possible. Service users matching the desired characteristics were initially identified by the IGT public health advisor, using the monitoring dataset. Each potential client was contacted by phone by the IGT public health advisor to ask if they would take part in the IGT evaluation. If the clients agreed, the interview appointment was confirmed in writing. This was thought to be a better approach than the CHPR team cold calling service users and more likely to increase response rates due to the rapport previously generated between by the IGT public health advisor and client group. Interviews were conducted by CHPR staff, were face-to-face, ranged from 32 to 64 minutes and took place in within a private space in the medical centres.

Practice staff

Key individuals within each of the primary care teams were identified by the IGT public health advisor and contacted by the CHPR research team. For convenience, interviews were conducted over the telephone.

Project team

All members of the project team and steering group were invited to attend a focus group facilitated by the CHPR team and took place at Leeds Road Hospital in Bradford.

2.1.2 Quantitative monitoring data

The monitoring data systems were developed by CHPR and steering group prior to the start of the IGT project. Monitoring data was entered in MS Excel.

Basic demographic and other descriptive information about the service user was collected at the first appointment with the IGT public health advisor, using the Initial Assessment Form (Appendix 4). Subsequent issues and progress were recorded using

the Continuous Assessment Form, whenever the service user had an appointment with the IGT public health advisor (Appendix 5).

Impact Indicators

After consultation with the Steering Group and advice from dietetic researchers, a number of indicators were identified to assess the potential impact of the lifestyle intervention.

a) Waist circumference in inches was measured by the IGT public health advisor at every visit by the service user.

b) Body Mass Index was calculated by measuring height and weight, converted into BMI using the following formula. BMI was measured at every time a service user visited the IGT public health advisor.

$BMI = (Weight \text{ in kg} / (Height \text{ metres}^2))$. BMI was then categorised into 1 of 4 categories.

BMI	Weight Status
Below 18.5	Underweight
18.5 – 24.9	Normal
25.0 – 29.9	Overweight
30.0 and Above	Obese

c) Glucose Tolerance was measured using 2 different techniques

The Glucose Tolerance Test (GTT) is used to determine how quickly glucose is cleared from the blood. Glucose levels (mmol/l) are assessed both after fasting and after 2 hours of administration of oral glucose. Individuals who have impaired glucose tolerance exhibit $> 7.8 < 11.0$ mmol/l measured 2 hours after glucose load. Normal glucose ranges at fasting and 2 hours are <6.1 and <7.8 respectively. (WHO, 1999)

The **HbA1c test** is a useful test to assess glycaemic control. Plasma glucose binds to haemoglobin to form haemoglobin A1c or HbA1c. The more glucose in the blood, the more HbA1c will be present in the blood. HbA1c is indicative of blood glucose levels

over the past 8-12 weeks. The test result is expressed as a percentage of glucose attached to haemoglobin. A normal non-diabetic HbA1c is 3.5-5.5%. Less than 7% indicates generally good glycaemic control. Values over 7% are generally indicative of a diagnosis of diabetes. Impaired glucose tolerance generally ranges from 6-6.9 %.

d) Physical Activity levels were assessed at baseline, 3, 6 and 12 months intervals. The General Practice Physical Activity Questionnaire (GPPAQ - Appendix 6) was used to assess physical activity level of service users. (Department of Health, 2006) While the primary function of this questionnaire is to screen patients in general practice for their activity levels, it has been well validated for adults in this setting and is quick and convenient to complete. Physical activity levels are converted into one of 4 categories.

Category	Physical Activity
Inactive	Sedentary job and no recreational physical activity
Moderately inactive	Sedentary job and some but < 1 hour recreational physical activity per week OR Standing job and no recreational physical activity
Moderately active	Sedentary job and 1-2.9 hours recreational physical activity per week OR Standing job and some but < 1 hour recreational physical activity per week OR Physical job and no recreational physical activity
Active	Sedentary job and ≥ 3 hours recreational physical activity per week OR Standing job and 1-2.9 hours recreational physical activity per week OR Physical job and some but < 1 hour recreational physical activity per week OR Heavy manual job

e) Self efficacy, “the belief that we can succeed at a specific activity we want to do” eg weight management. (Bandura, 1986 pg 238) has been found to be an important factor in mediating weight management outcomes. This concept was measured using the Weight Efficacy Life-Style Questionnaire (WEL- Appendix 7) developed by Clark, Abrams, Niaura, Eaton, and Rossi (1991) and has been shown to have good validity and reliability (Ruiz, Berrocal, Lopez and Rivas, 2002). The scores for individual constructs of WEL were calculated as detailed in Clark, Abrams, Niaura, Eaton, and Rossi (1991).

f) Other data.

Information about whether clients were signposted and attended other relevant services, was collected to determine if IGT project was able to act as a feeder to other programmes based in the Bradford area.

The monitoring dataset was obtained from the IGT public health advisor and inputted into SPSS. Data was cleaned, recoded to produce a dataset ready for analysis. In order to assess the levels of client deprivation, Indices of Multiple Deprivation scores and ranks were tagged to postcodes using GEOConvert software.

The minutes of the steering group meeting were used to supplement issues raised in interviews in order to contextualise the implementation of the IGT project and aid the development of cyclical data generation and analysis.

2.2 Analysis

Qualitative

For the purposes of analysis, the one-to-one interviews and the focus group discussion were recorded using digital recording equipment. All interviews were fully transcribed by members of CHPR team. Three researchers carried out the qualitative analysis, in order to validate the emerging findings. Transcripts were coded and themes identified, which were then organised into larger categories. This process is outlined by Pope, Ziebland and May (2000). Quotations have been used to evidence the qualitative findings. All participants were assured of their confidentiality therefore, to ensure participants could not be recognised, all quotations are listed anonymously.

Quantitative

Simple descriptive statistics were performed using SPSS. Appropriate inferential statistics were performed to assess change between baseline and the 3 month monitoring period using dependent t tests or Chi-squared tests. Statistical significance was assessed at $\alpha = 0.05$ level and p values are presented to evidence statistical significance.

Triangulation

Triangulation was undertaken using both semi-structured service user data and quantitative monitoring data. This served to unpick the impact of the IGT project on individuals producing a richer picture of the journey undertaken by clients.

2.3 Limitations

This study has a number of limitations which need be stated clearly before presenting findings from the project.

1. It is not possible to attribute detected impact changes to the intervention using the design of the study pre and post study without comparison. However, any clinical and statistical changes can be used to support the body of evidence about the effectiveness of lifestyle advice and action from individuals with impaired glucose tolerance and will aid the existing evidence base.
2. The attrition rates on the project (see finding from monitoring data section) were quite large between baseline and 3 months, reducing the overall sample size. This limited overall assessment of impact indicators for the longer follow up periods.
3. The copious and time consuming monitoring data requirements led to significant amount missing data for key indicators of physical activity and self-efficacy. Clients were asked to complete information at home if they did not have time within the appointment and sometimes questionnaires were not returned.
4. The GPPAQ is designed as a tool for screening the crude amount of physical activity in clients rather than as an objective measurement of physical activity outcome.
4. The IGT public health advisor and the CHPR team attempted to contact clients who had only attended 1 or 2 appointments in order to explore reasons for lack of engagement on the project. No clients either could be contacted or were willing to be interviewed, even over the phone. This is a very common experience with qualitative work of this nature. This may produce qualitative findings that are rather skewed to

clients that perceived the IGT project as valuable. Triangulating information from both the monitoring data and qualitative interviews was used overcome this limitation.

2.4 Ethical considerations

After consultation with Bradford Research Ethics Committee (REC), the project was classified as a service evaluation and therefore was not submitted for full scrutiny by the committee. Approval was given by the Chair of Bradford REC.

Informed consent for anonymised monitoring data to be used by the CHPR team was gained at the recruitment stage of the IGT project using consent form (Appendix 8).

Informed consent for service user interviews was gained prior to the interview and evidence using the consent form (Appendix 9). The client information sheet for the evaluation work can be viewed in Appendix 10. The right to withdraw from the evaluation of the IGT project was emphasised and was not divulged to the IGT public health advisor. This ensured that there were no adverse consequences for non-participation. Participation in the evaluation element of the IGT project was entirely voluntary. Informed consent for practitioners was gained over the phone and recorded for evidence.

No demographic information that could identify any of the research participants was presented within the findings chapter to ensure anonymity.

3. Findings from the Qualitative Interviews.

3.1 Preamble

The findings are presented using a patient pathway timeline to provide analysis of key milestones in the patient journey through the project. This client pathway is illustrated on page 36. Qualitative data from the perspectives of service users, PHC team and steering group members staff have been synthesised in common themes. This should provide richness and some degree of triangulation. The main themes are described and illustrated by the presentation of quotes from participants. The table below describes the number and demographics of the service users who were interviewed. Two clients on the IGT project referred from Horton Park Surgery were initially selected to be interviewed. One client declined and another cancelled the appointment.

Table 1 Number of client interviews

Practice	Numbers of clients interviewed
Bowling Hall Medical Practice	2 males and 2 females aged between 55- 80 years
Horton Park Surgery	0
Idle Medical Centre	1 male
Westcliffe Medical Centre	2 males aged between 23 and 54 years
Wibsey Medical Centre	2 males and 2 females aged between 36 - 59 years
Windhill Green Medical Centre	1 male and 1 female aged between 46- 58 years
Total	13 (5 females and 7 males)

A key member of the PHC team from each practice were interviewed by phone or took part in the focus group for the wider project team.

3.2 Key Themes

3.2.1 Identification of IGT (testing and diagnosis)

This theme related to the nature of the how clients came to be tested for IGT and their response to the test result.

Co-morbidity

The majority of the clients interviewed had received had a blood test to monitor another pre-existing condition such as hypertension, angina and coronary heart disease or colitis.

“I’d had trouble with my heart to start off with and then I got a blood clot on my lungs and they were keeping a check on me. I had to have this IGT one morning and they leave you there for two hours so to cut a long story short the results came back and this is when they told me that I had IGT” Client

“I’ve got chronic heart disease so I go to the doctor every year for a check up. Naturally they do every thing, when I took my test for my cholesterol this time in April of last year they sent me this letter and that’s how it came about. I went to see my practice nurse and she told me I’ve got this IGT thing” Client

However some patients were identified more opportunistically through health checks and routine blood test after probing about family history of diabetes. Some practitioners perceived they were sending more clients for testing because of the IGT project while others stated that they were still continuing to provide their usual routine care and testing regime.

“after she had finished speaking she did a health check on me. When she asked me if I had diabetes in my family which I do both my grandmas have had it, so they asked me if I would go for the blood tests and after about three or four blood tests it came back that I had IGT” Client

“Yes. I came to the doctors originally with my ankle, strange as it sounds if I hadn’t have gone over on my ankle I wouldn’t be having the tests done, it was weird how it all happened. I wouldn’t have thought just to come down and have a diabetes test as much as people have always told me to do it because of my family” Client

“I do try and think about the IGT project a bit more now so I request GTT more now especially when the risk factors are obvious and there is a family history” PHC staff

"I haven't really altered my practice as I always ask for GTT when it is appropriate, when they mention their genetic predisposition and when they are overweight." PHC staff

Affective response to the test

Clients expressed shock and anxiety after receiving their test results and some did not really understand what the result actually meant. However either PHC staff or the IGT-PHA clarified what the results meant and clients were reassured after these explanations. After some reflection many clients were relieved that IGT had been detected early before the onset of diabetes.

"A bit worried about the result. My mother-in-law and a few friends of mine were diagnosed diabetic and they have these blooming needles. So it does knock you back a little bit, with diabetics it's what they can eat, what they can't eat and needles" Client

"To be told borderline and not really knowing what it meant was difficult" Client

"If (public health advisor)..... hadn't have been here for me to come and see I don't know what I'd have done because I don't know what it really meant to me. Client

"I am glad I found out as early as possible" Client

3.2.2. Referral onto the IGT project.

Process and extent of referrals

The referral process was initiated by positive IGT test result and given to the IGT-PHA. The IGT-PHA contacted the patient in writing to outline a little about the IGT project and to arrange a suitable appointment time if the patient wanted further support. Both practices nurses and GPs made referrals. Procedures for referral varied in different practices. In some, a key member of the team took responsibility for alerting the IGT-PHA of positive IGT test results and in others, information was left in a designated area by several members of the PHC team to be collected by the IGT-PHA. Some PHC staff contacted clients before offering to refer onto IGT project and in other practices the first notification of referral was a letter from the IGT-PHA.

"Ideally in my practice what they should do is tell me they have made the diagnosis and I refer them to project, but as I say it's like chipping away sometimes it's a case of having to go pick up them to check that once a month to see diagnoses then I refer and I give the patients a ring or I drop a line and say this is on offer and it's a really good service and it will offer them some supportand would they be willing? PHC staff

" No it wasn't until I got the letter {from the IGT PHA} that I knew anything about it but I know he did refer me. I know this is a new thing that's set up" Client

There were some difficulties in maintaining a consistent system of referral and there was a sense in some practices not all IGT positive results were being referred onto the IGT project. Not all members of the PHC team had an interest in the IGT project, so it was difficult to have a consistent protocol for testing, diagnosis and referral.

The GP that picked it up in my practice, a GP with a specialist interest in diabetes so he will be alerted. He does all the diabetes, whereas I think if it's a GP and they are not really into diabetes really. PHC staff

"Occasionally I will send a note through and occasionally I will say don't forget anyone that you diagnose refer them to me, but if that's in the last couple of months if they remember but then it wanes and they just go back to doing what they have done for years, they just refer them to dieticians." Steering Group member

"because they are so used to making diagnosis referrals to the dieticians they just continue no matter what I may ask" PHC staff

There was an expectation prior to the start of the project that a great deal of IGT was undetected and that once practices had the opportunity to refer on the scheme that more IGT would be diagnosed. This was not in evidence in this pilot project. Different perspectives were expressed about the extent of referrals, either that maybe it not as prevalent as expected or that it is not routinely being detected.

"I think I presumed that there would be a lot more {IGT} within each practice than we have got but I think it has sort of come to light you think we have got loads and loads and then when you actually come round to it there isn't as many as you thought." PHC staff

It was felt that there was reluctance from some PHC staff to detect IGT because of very long waiting times for testing in acute settings and that increased detection could lead to over demand for a service leading to poor quality.

“There was only a select few in the first six months. I think the problem initially is with the diagnosis as well as not all the practices were doing the tests in the surgery they might send them off to the hospital” “Oh yes there was a big waiting list at the beginning.” PHC staff

“I think a lot of the time from GP’s I think it’s like opening a can of worms, they are just concerned that the services get worse and worse.” PHC staff

“There is this suspicion that there is a lot of people and obviously we’re not finding it, but that’s why the project started in the first place because of it was important there was no where else for them to go but it’s still that thing of opening the flood gates I guess.” PHC staff

Appropriateness of the referral

Some members of the PHC team had patients with existing IGT and were pleased to be able to refer patients onto the project as their only realistic service provision was advice and leaflets.

“I have had some patients that have had impaired glucose tolerance for quite while and it is difficult to help them. The only thing I can really do is really do is give them information about their lifestyle and exercise and possibly refer to a dietician but there are quite long waiting lists that is not great. I feel like I can treat patients that are diabetic. But having the project means that something can be done for the IGT patients. I don’t really have the time” PHC staff

“Yes. I’d had a high count for the past couple of years. He [GP] must have referred me because I got a letter from [IGT-PHA] asking me if I’d like to attend” Client

Clients that were interviewed felt that they were the right type of individuals to be referred onto the IGT project.

“Do you think it has been the right thing for you to be referred? Oh yes you can’t control

your intake unless you know what it's all about really can you..... I mean I hadn't a clue because when I first came." Client

However the wider project team noted that a small minority of individuals did not seem to be appropriately referred. These cases were mainly due to the complexity of the co-morbidity. Some patients had multifarious needs and lifestyle interventions to prevent type 2 diabetes may not have been the biggest priority, given the potentially immediate life-threatening nature of other illness. The IGT-PHA did not always have awareness of the medical history of the client referred, generally to maintain client confidentiality. This had implications for tailoring the consultations to individual clients needs.

"At the beginning when the patient came to see me he had allsorts of different complications like going for brain scans, he thought he had a brain tumour, heart valves. If I get someone like that and I get on this particular one I got his wife ringing me up saying why have I sent a letter, he's got enough going on, I feel that they should make me aware of that before because I wasn't aware.

Where as I have another lady who has complications because she has had previous anorexia problems. I was made aware of that so I knew about it, I knew where to tread carefully if I was told that I might step on the wrong ground." Member of Steering Group

The primary health care teams members interviewed all expressed how useful they considered the IGT project. They felt that another health worker could provide time and energy for clients with IGT, when they had little time and differing priorities. Some practitioners did wonder about the utility of sending older clients to a lifestyle intervention and about the effectiveness of lifestyle advice and support in general to clients with IGT

"The project worker has so much more time than me to sit and talk with clients. Our priority is to treat diabetic patients and to meet our targets." PHC staff

"We have a fair number of elderly clients who have IGT and that is just something that will happen with age I don't think it is fair to ask them to change at their age" PHC staff

"I don't know whether they will listen to the project worker..... for some people they know they should not be eating as much and should do more exercise so I think they will find it too hard to change" PHC staff

Choosing to attending the IGT project

Clients had a variety of reasons for deciding to attend the appointments with the IGT-PHA. Knowledge of diabetes from family and friends encouraged some to join the project. Many clients had no prior knowledge of prevention of diabetes and thought it was just something that happened to them that could not be halted. Information clarifying the difference between IGT and diabetes proved useful in prompting and maintaining attendance. Fear of becoming diabetic was an important motivating factor for joining the IGT project.

“What I was saying is that you are just waiting around to become diabetic somewhere along the line and it increase chance that going from glucose intolerant to being diabetic would be longer which is better for me rather than being on medication like my parents and family I think.” Client

“No I didn’t I thought once it was there (IGT) it was there. I didn’t realise something you could control yourself. I don’t think people really do where as I now realise that you can bring it down you can stop.” Client

“You have always got that thing in your mind as soon as someone mentions the word diabetes if you have got any sense you start to think you have got to be careful.” Client

“I thought this year is my wake up call” Client

3.2.3 Consultations with IGT public health advisor

The average time between getting the IGT test result and attending the first consultation for the service users interviewed was approximately 3 weeks. The first appointment with a client followed a quite structured schedule and was generally the longest lasting up to 60 minutes. An explanation of the project and clarification of expectations was followed by a discussion about current lifestyle. This was supplemented with the use of written leaflets about the project and lifestyle. Baseline data collection took place at this point for the impact indicators. Some clients were asked to complete food diaries of everything they ate and to bring it to the second appointment.

“She delved into what I was about, what kind of lifestyle I had I think the first meeting is selling yourself and she was selling herself” Client

"All weights and checking height and working out my BMI and telling me my ideal weights which I thought everybody has an ideal weight for their height" Client

"Yes information what to eat and it was quite interesting because I'd never realised you could look at charts and stuff and work out what you were suppose to do. It finished up at the end of the first session she said I want you to fill in for me some forms as to what your intake is in food and drink for two weeks and just mark down what you eat and what it weights and how many millimetres of fluid in take and we talked about that for a while and she asked me what I'd been eating and I told her. I did that for a fortnight, came back and I'd never realised until then because I'm old school" Client

The first few of appointments for new clients were set at two-three weeks intervals which were gradually lengthened to every one to two months the longer the client was on the project. The second and third appointment followed a similar pattern. If food diaries were kept by clients they were reviewed and discussed by the IGT-PHA and clients. A tailored package and individual goals were negotiated and agreed. Clients felt that setting their own goals was especially helpful, especially when compared to the very structured plans that they some clients had previously received from Dieticians. The IGT-PHA presented information about balanced diet using an Eat Well Plate (Food Standards Agency, nd) and this served to reinforce a healthy balanced diet. The GPPAQ instrument for physical activity also served as a useful tool for prompting discussion about maintaining and increasing activity levels.

"I came back in a week and showed her..(my food dairy).. and she looked at it and I thought that's no good. She said you're not drinking no water and I said no tea and coffee and she said what's all these cheese and fry ups. What we did was make a little plan Client

"Yes I did set targets but you have to set them your self. Yes and specially in terms of fruit, even now I have had some grapes before I came here." Client

"I measured everything with the scales and I looked at all the labels on the food stuff. I can go back with problems. I had a list of things I asked her after this fortnight because I couldn't understand everything" Client

“We did set a goal to bring my weight, down and weight and waistline. So it was a good thing. It did put me into the cycle I have to do this. Just do it before you go and see her.”

Client

“She was basically finding out what I had taken on board and what I had put into action.”

Client

In the subsequent appointments, progress was reviewed and data about weight loss and waist reduction was collected and feedback to the client. The IGT- PHA and client continued to analyse how to maintain and enhance any lifestyle change or where progress was stalled to unpick and overcome any barriers to behaviour change.

3.2.4 Lifestyle Changes

All the clients interviewed reported important changes in their behaviour, particularly in relation to food and nutrition. Clients also perceived that they were more informed about what food to eat and in what quantities. They altered their cooking practices, read food labels more effectively and developed the ability to habitualise their changes. For many this had lead to significant decreases in weight over the duration of the scheme.

“We started by changing the milk and sugar that I used and with the fry ups she said why don’t you grill instead of frying. Everything was altered over a period of two months until even my cheese was match box size so everything has stopped.” Client

“Yes. I was nineteen stone ten when I started which I couldn’t believe and a lot of people couldn’t believe. I was and I will admit that and I was embarrassed about that at the time but now I am eighteen stone, between eighteen stone three and six, so I have lost quite a bit.” Client

“No I were lazy. I’ve even got to the stage were I can walk up nine flights of steps at work now and at one time I used to get to the top and be out of breath but I don’t now I can do it quite easily.” Client

Clients had other added value in terms of increased confidence, greater propensity for social interaction to improve social health.

"I've taken my mind off by doing something and getting myself involved. I now do voluntary work but I've actually joined friends of Bowling Park, we've got a big park down here I've been out planting bulbs and I think I'd got myself into a bit of a rut. I'm happily married and everything but sometimes when you're retired you tend to sit about a little bit." Client

"Yes. It's the best thing it's given me so much confidence whereas I was sat at home like a recluse." Client

"Well it has motivated me a lot. I was sat at home at couch, but I've now gone onto a computer course as well.....it's changed me a lot it's done me good." Client

Service users also reported parallel changes in the family members' nutritional and physical activity.

"Yes. We have fish, we'd never touch fish but we do it was steak, steak, steak. She eats them now so it has probably done her [spouse] benefit." Client

"She does all the shopping so we took all these documents back and read them, our shopping budget became related to the information in the leaflets." Client

Facilitating factors to support change

Clients who perceived they were successful with weight loss noted a number of key factors that enabled them to initiate and maintain behaviour change. Having the IGT-PHA monitor and feedback their waist and weight measurements on a regular basis was the most important and frequently mentioned motivator for action. This seemed to be important to service users for two main reasons. Firstly receiving independent one-to-one feedback about their own success spurred people on to continuing their activities and action plans. Some clients previously attended other group-based weight-loss programmes and had not found them very private. Secondly, direct encouragement about their success from the IGT-PHA was intrinsically meaningful to the service users.

"I think losing the weight that quick made me think I can do this" Client

"How do you think you have managed to change?" ... "Because I was told that things were improving" Client

“You had a class of twenty people in there and I think it is bad because you get all these people saying losing all the weight and they are getting all the praise and the people the aren’t losing that much weight are sat at the side thinking I am paying to come here to listen to that person over there get that. So when you are on a one to one basis I think it is a lot more personal to yourself and I think it is a lot better” Client

“She [IGT-PHA] takes my weight and takes an interest in it and my BMI, I think in the past you never have anyone to help you, I think a lot of people are obese, overweight they just give up don’t they.” Client

“I can go to work and tell my mates that I have lost this much and they will say well done but it is when a stranger tells you, you have lost this much. It feels better than a friend or a family member.” Client

“but you don’t always listen to your parents, when it’s someone else you have let them down as well, because if they are spending their time trying to explain to you...” Client

Some service users felt that their own sheer determination combined with support and information was important in their making changes to their nutrition and activity levels. The nature of the support was very central to the client engagement and a recurring theme was one of flexible tailored advice and graduated negotiated action points.

“Since I’ve been with [the IGT project] I’ve lost a stone and a half through talking to [IGT-PHA] and will power on my part.” Client

“Giving me the information that was the big one because I had no idea where to go or what to do.” Client

“This silly dietician it’s ‘you can only have six chips, you can only have seven portions of protein and four portions of this and two portions of fruit’. I love my fruit and raw vegetables. This is much service is better for me and more manageable” Client

“The [IGT-PHA] did the initial not shoving but gently nudging me that way and I’ve done it.” Client

The opportunity to improve their health, reduce their chance of becoming diabetic and prolonging their lives also served as powerful cues to action.

“I know that by listening to what I've been told and taking the advice that I've been given that I'm going to extend my life.” Client

“I didn't want to get into the diabetic thing and I think losing the weight will help to do that. I didn't really know that before.” Client

Barriers to making change

While the majority of service users that were interviewed stated successful weight loss, a minority reported experiencing difficulties in maintaining change. These barriers were unique to each service user but one element could be characterised as breaking from the routine habits that had been formed. They ranged from special occasions for example birthdays, family parties and holidays. Two male clients felt that their shift patterns of work made it difficult to maintain their new eating routines. One client felt that the cost of nutritious food meant that they were spending more than they used on their household budget although this had not put them off continuing to buy and consume to food. Over a third of the clients interviewed found making changes in physical activity levels harder to achieve than food related alterations.

“it's what I should be doing but I seem I can stick to the diet but the exercise bit, because I drive as a living and because how the nights are now it's not so good. We started cycling but again it's winter weather now so two new bikes sat in the garage not doing nowt.” Client

3.3.5 Service Satisfaction

The IGT project was received extremely positively by the service users that were interviewed. The main features of this strong satisfaction were related to the IGT-PHA. A good rapport and ease of manner were noted by the majority of the service users. This relationship encouraged them to keep coming back to the service. This was in sharp contrast to how clients viewed services within general practice or other types of medical services, which were thought of as much more daunting. The way information was imparted was particularly valued and fundamental to then behaviour change initiation and continuation on the scheme. Clients felt that they were advised rather than told what to do and there was a stronger sense of negotiation and control about what changes they could make.

“Yes, she comes across as if you have known her for a long time, it makes you feel at ease.” Client

“[The IGT-PHA] never said if you don’t do this, this will happen, like the doctor just saidso I think the information and advice so far is a big eye opener I am defiantly grateful for the [IGT-PHA] telling me all this because I wouldn’t have found out any other way.” Client

I feel with the doctor they are telling youit is their job to make you understand that if you don’t do owt you are going to be in trouble and it makes you feel bad, but you need to know but you don’t need to be told. Client

Yes and once you have met someone like [IGT-PHA] who has sold their own personality then you realised it wasn’t going to be official and intimidating. Because doctors can be, it can put you off. Client

“She put a bit of emphasis on exercise and I filled in the form, things improving now and never at any time she put pressure” Client

The key distinction separating the IGT service from other types of service was the time factor, with clients commenting on the fact that the IGT-PHA had more time for them, enabling a whole range of issues to be discussed and developed. The flexibility of the length of the appointment time was perceived as beneficial.

Something where you have no fixed appointment time I think that’s important really because you can miss so much out of a few minutes of the appointment. Client

It needs explaining to you but I know doctors would do but I don’t think they would have done it in quite the depth that [the IGT-PHA] has.....I think it’s fantastic. Client

All clients stated that one of the most valuable aspects of seeing the IGT-PHA was that they had been able to build up a relationship with a single person who provided consistency and constancy.

“I think it would really because I think it’s nice to have somebody there that you can talk to and if you’ve got any problems you can sort it with them.” Client

“She’s always been there, I can always ring her or email her and say I’ve got a problem can you help me. She’s been quite good.” Client

“I would say it was someone I talked to and someone who is looking after your interests”
Client

[The IGT-PHA] is that sort of lifeline that I need to help me in any way. Client

3.3.6 Signposting

A number of clients interviewed were signposted to other services mainly related to physical activity. Those that attended found them particularly beneficial and generated added value to health because of the extended friendship networks that were created.

“she’s put me onto exercise classes and things like this. I’ve got to admit I love them but again it’s because I didn’t know where to go and she has found it and said how about doing this and how about doing that. She’s listened to what I’ve said.” Client

“I do four classes a week and I’ve joined a walking group so I go walking.” Client

“I have made so many new friends by doing this it’s just unbelievable. It really is good and we have such a laugh. There’s about ten of us that go on the walking group and it’s lovely.”
Client

However not all clients wished to be signposted to other services and just valued the IGT consultations in isolation. Some clients wanted to concentrate on nutritional behaviour change and were not ready to consider wider exercise schemes.

“there are lots of organisations in Bradford that do group exercise where people meet and things like that, has she talked to you about those? Yes she did but it wouldn’t suit me. I like to set my own targets and do it myself.” Client

4. Findings from Monitoring Data

This section contains data following analysis of the monitoring data provided by the IGT-PHA in January 2009. This data was collected between May 2007 and Jan 2009. A description of the practice and patient characteristics is followed by analyses of the main impact indicators of the project.

Practice and Service User Information

Table 2: Number of Service Users by Practice

Practice	No of service users referred
Wibsey Medical Centre (project start date April 07)	25
Bowling Hall (project start date May 07)	9
Windhill Green Medical Centre (project start date June 07)	20
Horton Park (project start date September 07)	17
Idle Medical Centre (project start date September 07)	19
Westcliffe Medical Centre (project start date May 08)	18
Total	108

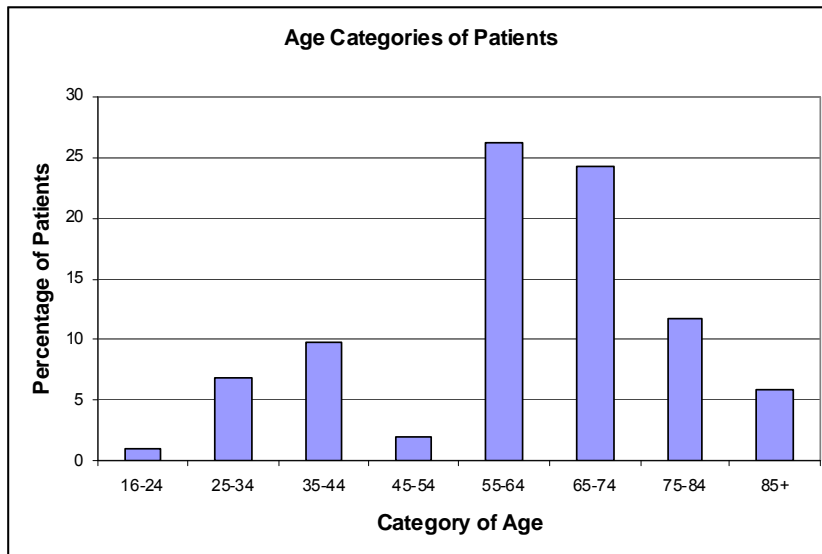
Six practices were involved in the scheme, although all came on board at different time periods. Westcliffe Medical Centre was the last practice to join and was able to refer many service users in a relatively short time.

Table 3: Characteristics of the Service Users

Characteristic		
Gender n (%)	female	43 (39.80)
	male	65 (60.20)
Ethnicity n (%)	White British	91 (84.30)
	Asian Pakistani	11 (10.20)
	Asian Indian	3 (2.80)
	White Irish	1 (0.9)
	White	1 (0.9)
	White Other	1 (0.9)

The majority of clients referred were male and predominately classified as White British. To some degree this reflects the patient status of the practices involved in the project and the ethnicity of the project worker who provided the service in English.

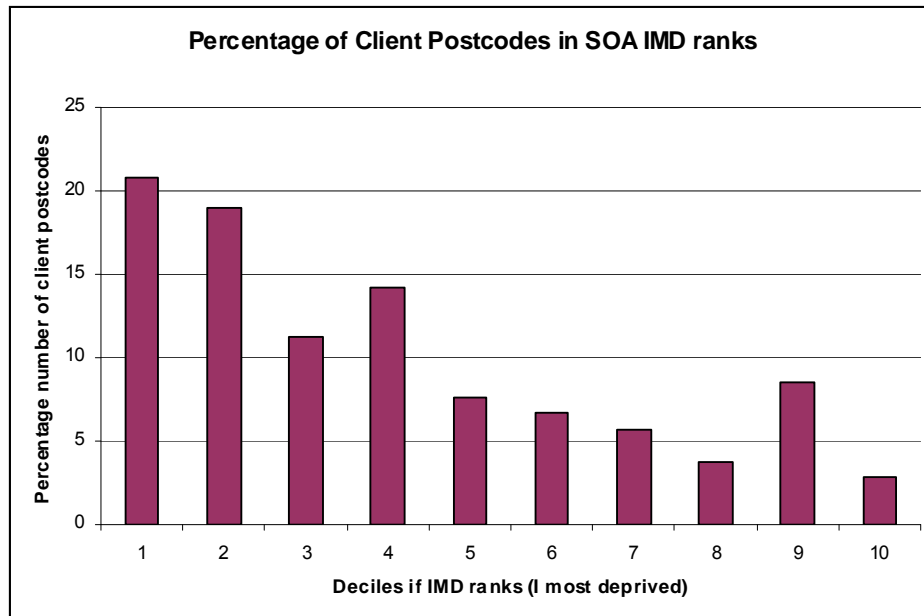
Figure 1: Age of Service Users



The age range of service users referred to the scheme varied greatly although was skewed to the older age categories, with 42% of clients aged 65 and over.

The Figure below provides good evidence that the project was able to reach clients from varying socio-economic backgrounds.

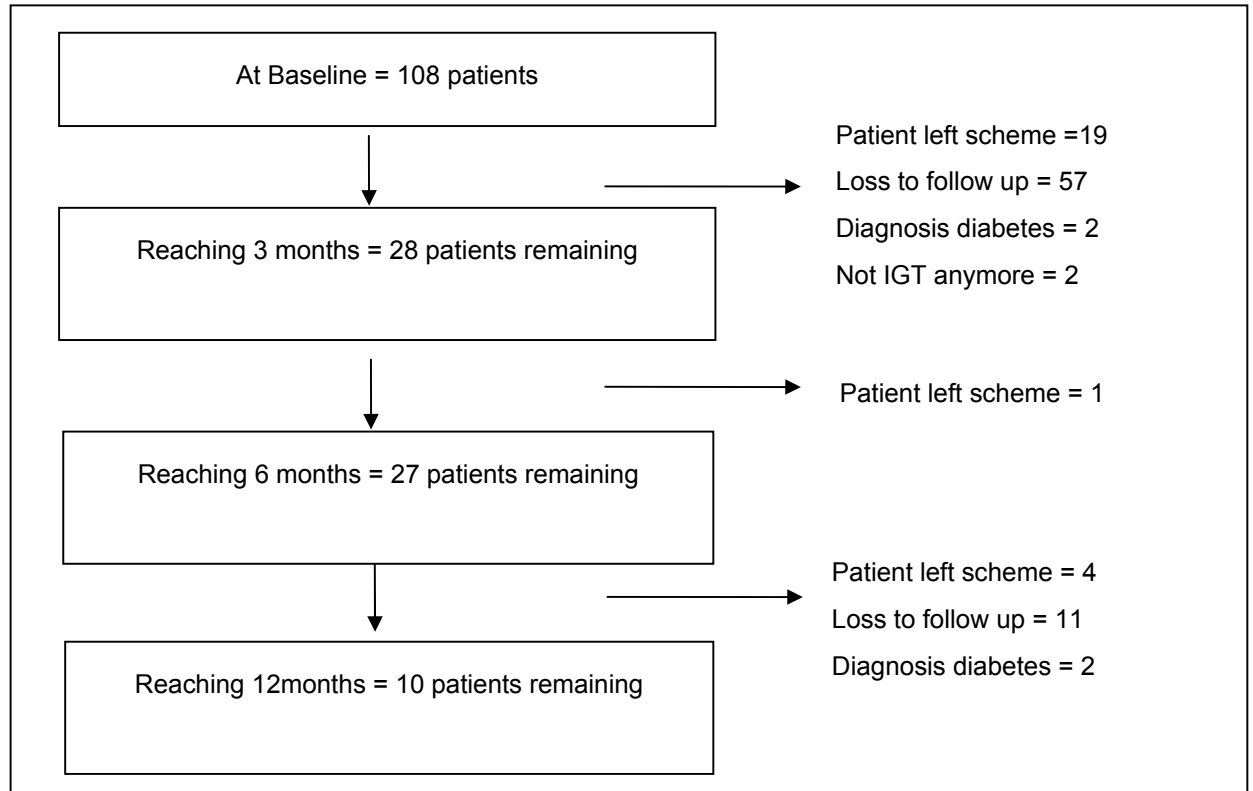
Figure 2: Indicator of Patient Deprivation



Over half the clients, 51%, were living areas in the 30% most deprived super output areas in England and Wales, who tend to be those who are harder to reach.

The flow chart below displays information about the status of each client referred onto the IGT scheme. As individuals within the monitoring dataset are at multiple points in their patient pathway this flowchart is presented to track each and every client that was referred and attended at least one appointment with IGT-PHA.

Figure 2: Flow chart of Service Users throughout project



Where clients explicitly informed the project worker of their intention to leave the scheme this was recorded and categorised. The reasons that service users left the scheme were varied included moving away from area, being referred to other services such as dietician, having other serious health issues and just not wanting to continue on scheme. Loss to follow up was characterised by clients who just stopped attending and gave no reason despite attempts by the project worker to maintain contact and obtain reasons for lack of attendance.

A small number of clients became diabetic during this time period and were discharged from the scheme to usual diabetic services.

The majority of the clients (70%), while attending appointments in the early stages of the scheme, elected to stop attending prior to the 3 month monitoring time period. In

general females were better attendees than males. There were no statistical differences in referral or attrition patterns by age or gender by any of the practices.

Changes in Impact Indicators

Data for the key indicators related to diabetes provided at the 3 month monitoring time period is presented in the table below. Given the small amount of data available for the 6 month and 12 month periods, only the information for the 28 service users remaining at the 3 month monitoring period is displayed, except for GTT and HbA1c tests which are only undertaken at 6 and 12 month monitoring periods.

Table 4 Changes in impact indicators

Indicator	Baseline	3 months * ₁	Change	Significance
Waist inches mean (sd)	42.89 (4.39)	41.70 (4.38)	1.19	t= 6.18 p=0.001
Weight kg mean (sd)	92.63 (19.40)	89.58 (17.09)	3.05	t= 3.19 p= 0.004
BMI category (%)				$\chi^2 = 17.43$ p= 0.07
Normal	20	15		
Overweight	36	33		
Obese	44	52		
Mean BMI (sd)	32.84 (7.19)	31.97 (6.71)	0.87	t= 3.02 p= 0.006
Physical activity (n)				$\chi^2 = 32.5$
Inactive	7	4		
Moderately inactive	14	9		
Moderately active	5	12		
Active	2	3		p= 0.06
IGT tests at 6 months				
HbA1c (n= 13) % glucose attached to HB	5.72	5.70	0.02	t= 1.251 p=0.864
GTT (n= 14) (mmol/l) 2 hours after fasting	9.26	8.14	1.12	t= 1.251 p=0.30

*₁ except for IGT tests performed only at six monthly intervals

At 3 months there were statistically significant decreases in waist circumference (from 42.89 to 41.70 p=0.004), weight (from 92.63 to 89.58 p=0.006), and mean body mass index (from 32.84 to 31.97 p= 0.001). However in general these changes were of a relatively small order of magnitude. While there were clearly improvements in the categories of physical activity with more individuals reporting higher levels of physical activity this did not reach statistical significance ($\chi^2 = 32.5$ p=0.06).

Good glycaemia control, measured by HBA1c and GTT tests, was maintained up to 6 months. Importantly this indicated that on average, clients were not becoming more glucose intolerant. The GTT result after fasting indicated a reduction to normal levels of glycaemia control (6.0 mmol/l) at 3 months, a clinically significant outcome, although this did not reach statistical significance ($p=0.23$). Two service users were no longer classified as having impaired glucose tolerance, although 2 service users did become diabetic during this time period.

5.0 Discussion of evidence

In this chapter the results are considered in relation to the four main evaluation aims. Points for consideration pertaining to the future service development are highlighted using a client pathway through the IGT project leading to a set of recommendations. The strength of evidence and triangulation of findings are assessed. Information collected throughout the lifespan of the pilot project from the steering group is used to promote discussion and highlight areas of strength and further development.

Is the IGT project acceptable, relevant and appropriate for clients and primary health care staff?

Data presented in the findings suggested that the IGT project was a relevant addition to the service provision within general practice. Clients and staff interviewed felt that primary prevention of type 2 diabetes was a worthwhile activity and had the potential to improve the health of the clients who were referred. Clients were able to be tested for IGT, receive the test result and on receiving a diagnosis, be referred to an IGT-PHA.

The clients interviewed perceived their referral onto the scheme as appropriate and felt that they had the capacity to benefit from the scheme. Many were previously unaware of IGT as a condition or that type 2 diabetes could be prevented through lifestyle modification. This has implications for raising awareness in a potentially information poor patient population. Only rarely were patients referred inappropriately either because of complex life threatening conditions where lifestyle change was not the major care priority or where clients did not have IGT. This was largely rectified by the IGT-PHA negotiating confidential access to client details using the GP information management system. Communication between the IGT-PHA and primary health teams was in the main very solid and each practice developed an approach that worked for them.

An issue about limiting the upper age of referral on to the IGT scheme issue was raised continually via the steering group meetings. As the total risk of developing IGT and type 2 diabetes increases dramatically with older age there was debate about limiting the upper age to 74-75 years of age. Eighteen percent of the patients referred were 75+ and there were no differences in outcome or attendance rates for this group compared to

clients less than 75 years old. This would seem to indicate that the scheme was valued and meaningful to the older clients that participated. There is no data to suggest that an upper limit should be set at the current time. This will need to be monitored in the future to determine any differences in outcome and attendance in the future with a larger sample size.

The IGT pilot project was successful in recruiting and maintaining clients classified as South Asian although these were mainly clients who did not need a translator. Given the greater proportional risk of type 2 diabetes in South Asian clients living the UK, some consideration for the needs of limited English-speaking South Asians may be necessary.

What factors influenced the delivery and utilisation of the IGT project in general practice?

This subsection discusses and synthesises information about the initial processes of the IGT project namely diagnosis, testing and referral systems.

The extent of referrals from practices into the scheme was an important topic of discussion in the steering group meetings, during the implementation of the pilot project. One of the initial delays in the process of referral was related to testing and diagnosis. Long waiting times up to 5 months for client GTT testing in acute settings meant practices were unable to refer rapidly into the scheme. However this was resolved because general practices started to perform HbA1c test themselves on clients themselves and/or send blood specimens to Bradford Royal Infirmary enabling results to come through within a week. This practice was disseminated in other participating practices to overcome testing and diagnosis difficulties.

The decision about which patients test for IGT was rather ad-hoc and often appeared to be dependent on the specialist interest of individual primary health care staff member rather than agreed and shared protocol. There was perception, at the inception of the project that large numbers patients would be identified as IGT and then be referred on the project. This has not really been evident in the monitoring data to date, although there has been considerable variation between practices. General Practices in Yorkshire and Humberside have an average of 1560 individuals on their patient list (Information Centre for Health and Social Care, 2008). If the prevalence of IGT in a general

population ranges from 2-23% (Eriksson *et al.*, 2009) we may crudely estimate between 31 and 358 patients would be IGT in an average general practice. The age and ethnic profile would also influence the amount of IGT present in a practice population. Some of these newly identified IGT clients would also be classified as having type 2 diabetes and be referred to usual diabetic service provision. Drawing on this information, actual referral rates do not appear to be very low.

Nevertheless evidence from literature suggests that more a systematic approach to screening adults to quantify diabetes risk, would increase detection of undiagnosed IGT and thereby offer greater opportunity for primary prevention of type 2 diabetes. Generating risk scores from routinely collected data in general practice such as BMI, age, family history, hypertension and ischaemic disease have been found to be useful predictors for IGT in both general adult populations and UK South Asian populations (Griffin, *et al.*, 2000; Hanif, *et al.*, 2008). In addition, simple HbA1c tests instead of the more protracted GTT have also been found to be a valid screening test for IGT and could be performed in general practice settings (Aldasouqi and Gossain, 2009).

How effective is the IGT pilot project in motivating and supporting individuals to make lifestyle changes?

Both qualitative and quantitative data were available to assess impact and outcome indicators associated with weight management and reduction or maintenance of current in IGT status. All clients interviewed reported important changes in weight management behaviour, varying degrees of weight loss and reductions in waist circumference. The pooled quantitative data revealed significant but rather small changes in these indicators at the 3 months time period. This is likely to reflect the tendency for respondents who agreed to be interviewed to have greater success and are more positive about the IGT pilot project. The relatively small amounts of change detected are rather disappointing but are likely to be a reflection of the great diversity of the clients group involved in the project and the difficulty experienced by overweight and obesity individuals to achieve tangible outcomes. Some clients did report barriers to initiating and maintaining increased physical activity levels. Boosting physical activity levels at the same time as making positive nutritional changes is likely to act synergistically and could potentially boost the outcome effectiveness of IGT project. The statistically significant but clinically small changes show potential effectiveness for the future. It may be that as the sample

size increases with time, more clinically significant changes may be detected and maintained for longer time periods. The evidence base of quantitative effectiveness at the current time lacks strength unlike the good strength of evidence of qualitative experiences of the clients on the IGT project.

More positively the HbA1c and GTT data indicated that clients were not generally developing to the more serious condition of type 2 diabetes, as only 3 clients were diagnosed as diabetic during the lifespan of the project. This is very promising given that one of the major aims of the IGT pilot project is to assess the feasibility of primary prevention of type 2 diabetes. The data may indicate that small but significant reductions in risk factors may have large protective effects against development of type 2 diabetes. Further analysis of a more complete comprehensive monitoring data set will enable these issues to be disentangled.

One of the major issues for consideration is the relatively large attrition of clients who are initially referred onto the scheme who choose not to continue attendance. Some degree of drop out for these types of schemes is always expected. It was not possible to collect data from these individuals and it would be useful to identify why they elected not to continue on the project. Several suggestions can be offered to explain this drop out. The project may not have been what was expected and clients may not have wanted to address their IGT status by lifestyle interventions. Given that some clients received their letter of referral directly from the IGT-PHA they may have perceived that it was a routine appointment in general practice rather than a specific weight management project, in which they did not want to participate. Further research to illuminate this issue is necessary.

The clients that maintained their contact with the IGT project clearly benefited and valued the scheme. Service satisfaction for the clients that were interviewed was extremely high and the sensitive, less prescriptive, flexible and tailored approach during the scheduled was very much welcomed. This is one of the major achievements of the IGT project which centred around the key worker IGT-PHA. If the project uses other workers a similar model and approach should be developed to ensure consistency between practitioners.

The challenge for the development of the IGT project is to maintain attendance and

contact with individuals through a significant time period. Clients welcomed the routine progress reviews by the IGT-PHA and indeed this was one of the most important motivating factors that prompted maintenance of both behavioural compliance and continued attendance on the scheme. However this could also be one of the characteristics that may have contributed to clients initially referred onto the scheme not wishing to continue.

The qualitative data served to elucidate how transforming the scheme had been for some clients. The signposting to other agencies enabled some clients to enhance their social networks and develop a great sense of well-being which they perceived as equally important as the gains related to weight management and type 2 diabetes. The amount of signposting was relatively small and increasing it for some clients is likely to prove valuable if initial reluctance can be overcome.

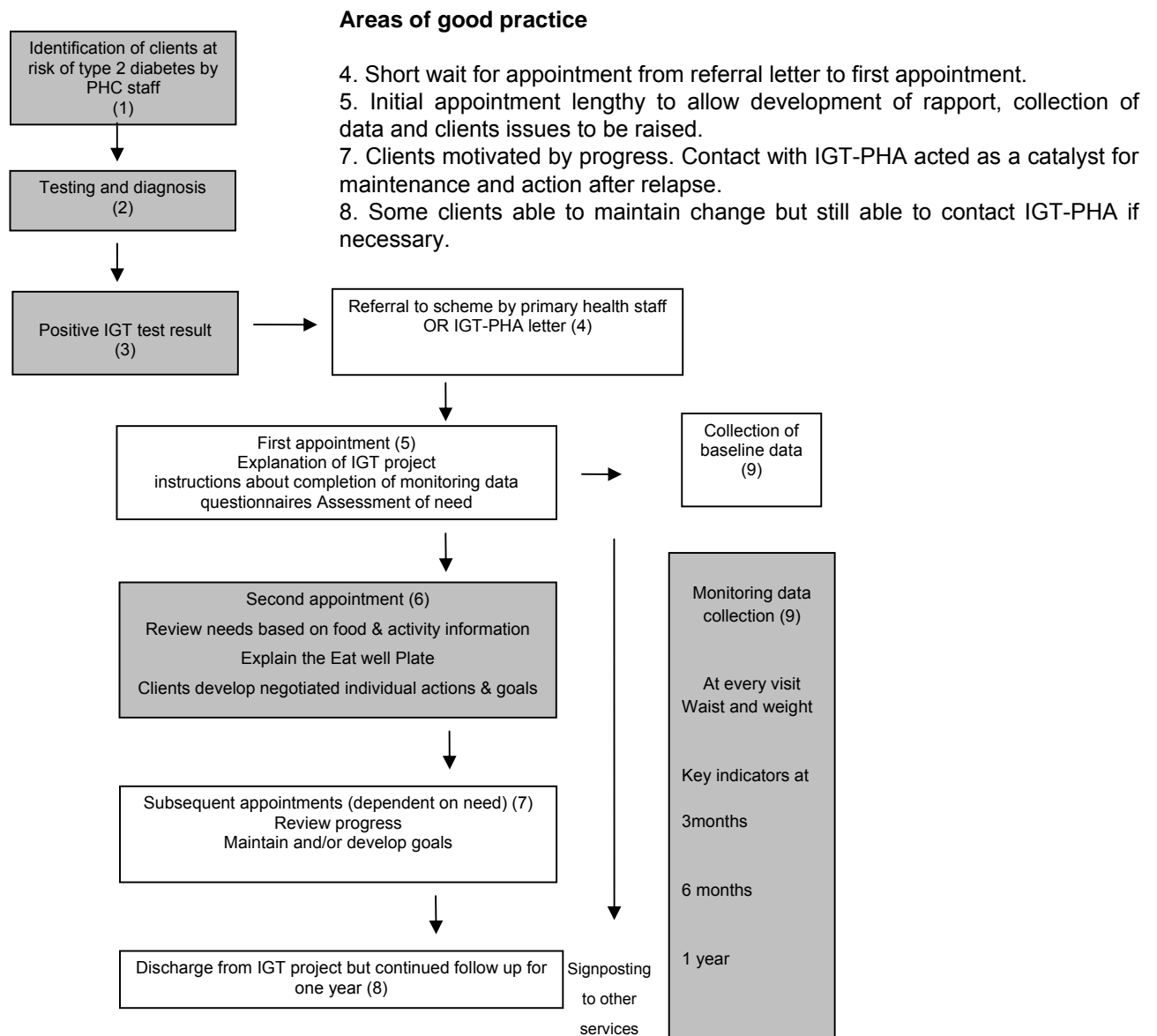
Can monitoring systems to measure intermediate and long term health outcomes of participants be developed?

Having identified the main indicators for success, monitoring forms were designed in addition to valid tools to measure physical activity and self-efficacy. Clients and the IGT-PHA found the sheer amount of data collection rather overwhelming which led to quite a lot of missing data for these 2 indicators. The monitoring data process and data entry were on the main solid but some errors in the data set were detected particularly for age. The major challenge for the IGT pilot project is to provide a strong evidence base for effectiveness. Currently this is difficult to achieve because of the large attrition rates and presence of incomplete data for some participants. Nevertheless the monitoring data was able to provide a framework for assessing impact and outcome change through time at an individual, practice and project level.

Future Development

The main processes within the IGT pilot project are displayed in the following client pathway to highlight the main issues for future service development.

Figure 4 The Client Pathway through the IGT pilot project.



Recommendations

To develop some health education materials that would raise the awareness about impaired glucose tolerance and the preventable nature of type 2 diabetes in practice populations. This may boost enquires and initiate the possibility of self requests for testing, diagnosis and referral on the IGT project.

To assess the feasibility of using a convenient shared formal protocol for all referring primary health care staff to identify patients on the practice list who are likely to be at risk of type 2 diabetes. This could take the form of a screening or case finding approach.

To use the more rapid and simpler HbA1c test to identify individuals who are IGT. This has been found to have good sensitivity and specificity in comparison to the GTT (Bennet, Guo and Dharmage, 2007) which clients found onerous and inconvenient. This would have the added advantage that clients would not have to spend several hours fasting and being immobile, as HbA1c can be measured at any time of day regardless of duration of fasting or the content of a previous meal.

Develop better information systems at the point of the IGT diagnosis and referral to project so that clients are fully informed about the nature of the test, what a result may mean and what the project can offer. This would reduce anxiety regarding results and lead to fully informed referral.

Undertake further research about why significant numbers of clients do not continue on the IGT pilot project after initially attending.

Consider extending the service to clients who may have limited English-speaking ability by using IGT-PHA who can speak South Asian languages particularly Urdu.

Develop mechanisms to boost the amount of physical activity levels for some clients who find this type of action more challenging.

Continue to collect data for up to one year to measure the long term effectiveness in weight management and prevention of type 2 diabetes. This would enable a stronger evidence base for work of this nature for larger sample sizes.

Reference List

Bandura, (1986) *Social Foundations of thought and action: A social cognitive theory*. Engelwoods Cliffs, New York, Prentice Hall.

Bennet, C.M, Guo, M. and Dharmage, (2007) HbA1c as a screening tool for detection of type 2 diabetes: a systematic review. *Diabetic Medicine* **24**, 333-343

Clark, M. M., Abrams, D. B., Niaura, R. S., Eaton, C. A. & Rossi, J. S. (1991). Self-efficacy in Weight management . *Journal of Consulting and Clinical Psychology*, **59**, (5) 739-744

de Vegt, F., Dekker, J.M., Jager, A., Hienkens, E., Kostense, P.J., and Stehouwer, C.D.A., (2001) Relation of impaired fasting and postload glucose with incident type 2 diabetes in a Dutch population. *JAMA*, **285** (16) 2109–2113.

Dunstan D.W., Salmon, J., Owen, N., Armstrong, T., Zimmet, P.Z. and Welborn, T.A. (2004) Physical activity and television viewing in relation to risk of 'undiagnosed' abnormal glucose metabolism in adults. *Diabetes Care* **27**: 2603–2609.

Food Standards Agency, (nd) The Eat Well Plate [Internet] Available as <http://www.eatwell.gov.uk/healthydiet/eatwellplate/> accessed on 4 February 2009

Garber. A.J., Handelsman, Y., Einhorn, D., (2008) Diagnosis and management of prediabetes in he continuum of hyperglycemia — When do the risks of diabetes begin? A consensus statement from the American College of Endocrinology and the American Association of Clinical Endocrinologists. *Endocrin Pract*, **14**, 933–946.

González, E.L.M., Johansson, S., Wallander, M-A. and García Rodríguez, L.A. (2009) Trends in the prevalence and incidence of diabetes in the UK: 1996–2005. *Journal of Epidemiology and Community Health*, **63** (4) 332-336.

Knowler, W.C and Diabetes Prevention program Research Group (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention and Metformin. *New England Journal of Medicine* **346**:393-403.

Lindstrom, J., Ilanne-Parikka, P., Peltonen, M., Aunola, S., Eriksson, J. and Hemio, K. (2006) Sustained reduction in the incidence of type 2 diabetes by lifestyle intervention: follow-up of the Finnish Diabetes Prevention Study. *Lancet* **368**: 1673–1679.

Nathan, D., Davidson, M., Defrenzo, R., (200&) Impaired fasting glucose and Impaired glucose tolerance: Implications for care [Consensus Statement: Reviews/commentaries/ADA Statements]. *Diabetes Care*, **30** 753–759.

Olroyd, J.C., Unwin, N.C. White, M., Imrie, K. Mathers, J.C. Alberti. K.G.M.M (2001) Randomised controlled trial evaluating the effectiveness of behavioural interventions to modify cardiovascular risk factors in men and women with impaired glucose tolerance: outcomes at 6 months. *Diabetes Research and Clinical Practice* **52** (3) 29–43

Patton, M.Q.(1990) *Qualitative Evaluation and Research Methods*. London, Sage Publications.

Pope, C., Ziebland, S. and Mays, N. (2000) Analysing qualitative data. *British Medical Journal*. 320 114-116

Rexrode K, Carey V, Hennekens C, Walters E, Colditz G, Stampfer, M. (1998) Abdominal adiposity and coronary heart disease in women. *J Am Med Assoc* **280** (3): 1843–1848.

Ruiz, V.M., Berrocal, C., López, A.E. And Rivas, T. (2002) Factor Analysis of the Spanish Version of the Weight Efficacy Life-Style Questionnaire. *Educational and Psychological Measurement*, **62** (3) 539-555.

Schulze, M.B. and Hu, F.B. (2005) Primary Prevention of Diabetes: What can be done and how much can be prevented? *Annual Review of Public Health*, **26** (4) 445-467

Tuomilehto, J. *et al.* (2001). Prevention of type 2 diabetes by changes in lifestyle among subjects with impaired glucose tolerance. *New England Journal of Medicine* 344:1343-50.

World Health Organization (1999) *Definition, Diagnosis and Classification of Diabetes Mellitus and its Complications: Report of a WHO Consultation. Part 1: Diagnosis and Classification of Diabetes Mellitus*. Geneva, World Health Organisation.

World Health Organization (2002) *Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. Tech. Rep. Ser. No. 916*, Geneva, WHO.

Appendix 1: Service User Interview schedule

1. Referral processes

Can you tell me how you first came to the IGT service ?

Prompts

- What did you know about the test you went for ?
- Who referred by?
- Knowledge about why you were first referred?
- Were you the right type of person to be referred?
- Feelings about being referred?
- Had you ever considered these issues before and if so what had they done about them?

What happened after you were referred?

Prompts

- Why did you decide to attend the appointment with Clare ?
- What were expectations about the service?
- What were you told about the service before you went ?
- How long did it take for you to get you test result and then how long did take to get an appointment with Clare?
- How did you hear about the appointment and was the appointment convenient?

2. Implementation and delivery

What happened the first time you saw Clare?

Prompts

- What did you talk about?
- How did it make you feel seeing Clare?
- Was it easy to talk and why?

Action planning

Prompts

- Were tasks set and an action plan agreed?
- How did you decide about the nature of the tasks?
- How difficult was it to achieve the tasks?
- Were they successful in meeting the tasks?
- What factors helped or hindered in trying to achieving tasks?

Other appointments with Clare

Prompts

- How many times have you seen Clare?
- What happened on these visits?

Signposting

Prompts

- Were you given any information about any other services?
- What did you think about this information?
- Did you attend any other services?
- What were the services like?
- Did you go on your own?
- Are you still using these services?
- What did they get out of using this service/s
- Are there any difficulties in using the services

Outcomes

Prompts

- As a whole what do you think you have got out of the IGT service?
- Has it matched your expectations?
- If the IGT services didn't exist would it make any difference?
- What were your specific needs at the start and have they been met?
- Are there any other things that have changed as a result of coming on the IGT service?
Eg Confidence, psycho-social health, social support

Follow up and after care

- How have you managed since you have stopped seeing Clare as regularly?
- What things have you done differently?
- Have you managed to maintain the change/s
- How do you do this?
- What plans do you have for your future?

Close

- Are there other things you would like to say about the service?
- What are the main things that you would like me to take away from this interview?

Appendix 2 : Interview schedule (Referring Agencies)

1. Introduction

When did you first hear about the pilot IGT project?

Why did you decide to get involved?

Have you discussed the project with colleagues outside your practice?

What did you hope to achieve?

How was the project set up?

2. Referral processes

On what basis do you refer patients to the scheme?

- What do you think about these criteria?
- Is there anyone excluded from the service?
- Are there any barriers or limitations of the referral process?
- Anything that could/should be changed?

What are patients told about the referral?

- How have they felt about this?
- Has anyone not wanted to go and why?

3. Outcomes

What do you think are the main benefits for patients on the scheme?

- Have you received any feedback from patients?
- Do you know what has happened to patients that you referred?
- Do you still see them?

4. Communication and Partnerships

- What has your practice got out of working with the IGT project?
- Do you think that the scheme duplicates your work or brings something unique
- Have there been any limitations?
- How can these be overcome?
- How much contact have you had with the project team and key worker and what kind of things do you discuss?
- Do you have any concerns about referring your patients to the scheme?

5. Future Opportunities

- What recommendations would you make about the development of the scheme?
- What future do you see this scheme having in your practice?
- What future do you see this scheme within Bradford and NHS provision nationally?

Appendix 3: Focus Group Schedule for Project Team

We would like to use a chronological timeline approach to this focused discussion considering why and when the project was set up and how things have been going.

1. Introduction and Consent Processes.

Outline the process and sign research ethics consent forms

2. Setting up the project

a) How did the project come into being ?

Prompts

Where did the idea come from?

Was it an idea based on needs of clients or part of a top down strategy or both?

What were the drivers ?

How did it fit into everything else going on in Bradford or regionally?

b) What happened next after the initial idea?

Prompts

How was the project set up ?

How were practices invited to join? How did you choose what practices would be part of the project?

How was the Public Health Advisor chosen what criteria and competencies ?

c)) What preparations were made about the consultations between the Public Health Advisor and clients?

Prompts

Any training provided fro PHA?

Any guidelines or protocols set up for the consultation ?

3. Implementing the Project

a) How was the project arranged in the practices?

Prompts

Rooming

Interaction between practice staff and PHA

Referrals

Information sharing between PHA and practices about clients

b) How were clients to be recruited and referred to the project?

Prompts How are clients identified from within a practice as being suitable for referral?
Is it the same in all practices?
Are some practices referring more than others why may this be?
How is the process working from both project and client perspectives?
What is a client told about the project before referral?
Have many clients not wanted to join the project and have they given any reasons?

c) How have consultations been?

Prompts What do you think a model of good practice would look like?
Have there been any issues that have been difficult?
How have they been handled?
Is there anything that you would like to do that you can't ?

d) Signposting?

Prompts Has much been done
Do you think that signposting is valuable?
Are there any gaps in the signposting to other services?

4. The future

a) What is working well and why?

b) What would you change if you could?

c) How effective do you consider the programme to be?

d) What information do you think would be valuable for the PCT and other organisation when they are making decisions about the IGT project?

e) How do you think the findings of the project should be disseminated?

ANYTHING ELSE you would like to say

Appendix 4 IGT Initial Assessment Form

Bradford and Airedale 

Teaching Primary Care Trust

IGT Initial Assessment Form

ID Number

Date

DoB

GP Location

Postcode

Advisor

GTT test result		Waist Measurement	
Weight (kg)		Height Measurement	
Smoker	Y / N	BMI	
Sex	M / F		

Ethnicity:

Relevant Lifestyle History

Appendix 5: Continuous Assessment Form

IGT Assessment Form

ID Number

Date

GP Location

Advisor

GTT test result		Waist Measurement			
Weight (kg)			Height Measurement		
Smoker	Y / N		BMI		

Progress

Appendix 6 GPPA Questionnaire

General Practice Physical Activity Questionnaire

1. Please tell us the type and amount of physical activity involved in your work. Please tick one box that is closest to your present work from the following five possibilities:

		Please mark one box only
a	I am not in employment (e.g. retired, retired for health reasons, unemployed, full-time carer etc.)	
b	I spend most of my time at work sitting (such as in an office)	
c	I spend most of my time at work standing or walking. However, my work does not require much intense physical effort (e.g. shop assistant, hairdresser, security guard, childminder, etc.)	
d	My work involves definite physical effort including handling of heavy objects and use of tools (e.g. plumber, electrician, carpenter, cleaner, hospital nurse, gardener, postal delivery workers etc.)	
e	My work involves vigorous physical activity including handling of very heavy objects (e.g. scaffolder, construction worker, refuse collector, etc.)	

2. During the last week, how many hours did you spend on each of the following activities? *Please answer whether you are in employment or not*

Please mark one box only on each row

		None	Some but less than 1 hour	1 hour but less than 3 hours	3 hours or more
a	Physical exercise such as swimming, jogging, aerobics, football, tennis, gym workout etc.				
b	Cycling, including cycling to work and during leisure time				
c	Walking, including walking to work, shopping, for pleasure etc.				
d	Housework/Childcare				
e	Gardening/DIY				

3. How would you describe your usual walking pace? Please mark one box only.

Slow pace
(i.e. less than 3 mph)

Brisk pace

Steady average pace

Fast pace
(i.e. over 4mph)

Appendix 8 Confidentiality, Monitoring and Informed Consent Form

ID Number

I understand that anything I discuss with the Better Health In Practice Advisor will be treated in the strictest confidence and only shared within the practice and with colleagues where it is felt necessary to do so.

I also realise that the Impaired Glucose Tolerance Project is a pilot programme, and as a result will need to be evaluated to see to see how worthwhile it has been. I therefore agree that my details (such as age, gender, postcode, ethnicity and weight details) and progress will be monitored and shared with the evaluation team at Leeds Metropolitan University and the IGT programme team. My name will not be mentioned in any reports, etc, and confidentiality will be maintained at all times.

Please complete the following :

I consent for my data to be used for monitoring purposes. ☐

I don't consent for my data to be used for monitoring purposes. ☐

If for any reason you decide at a later date that you no longer wish for your details to be used for monitoring purposes, then please inform the Better Health In Practice Advisor at any time.

Signed by patient: Date:

Signed by Advisor: Date:

Appendix 9 Consent Form for Service User semi-structured interview



Consent Form for Research Participants

Title of Project: Better Health in Practice

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

Please tick the boxes if you agree

I know that:-

1. My participation in the project is entirely voluntary ☐
2. I am free to withdraw from the project at any time without any disadvantage ☐
3. Any information about me will be destroyed at the end of the project ☐
4. The results of the project may be published but I will not be identified ☐

I agree to take part in this project.

--	--	--

Print Name

Signature

Date

Appendix 10 Service User Information Sheet.



Information Sheet for Participants of Research

Title of Project: Impaired Glucose Tolerance (IGT) Service with (removed name)

Please read this information sheet carefully before deciding whether to take part in this research.

What is the project about?

Leeds Metropolitan University have been asked by the project team and the health services in Bradford to evaluate how useful the Impaired Glucose Tolerance (IGT) service is.

What will you be asked to do?

We would like to talk to you for about 30-40 minutes about how you have found the service and what you got out of it. As we find it difficult to write everything down and value every word that you say, we would like to record the conversation, with your permission.

What will happen to the information you provide?

The data will be typed up and stored securely. No-one else will hear what you say, not your GP, practice nurse or project worker. The only person will know what you say is the researcher who has spoken with you.

Your names will not be used or collected as part of this research. The results of the research will be published in a report. We may use some of the words that you have spoken directly as quotes but will not use your names.

Informed consent and right to withdraw from research

The decision to take part in the research is yours and you should not feel that you have to take part. However, we would value your contributions to the research and feel that you are the best people to ask about the service. If at any time you wish to withdraw from the research you can phone or email the researchers to request that your data not be used.

If you have any other questions please call or email us.

Our details

Diane Lowcock

D.Lowcock@leedsmet.ac.uk

Phone 0113 8124409

Nicky Kime

N.Kime@leedsmet.ac.uk

Phone 0113 8124406